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Insights into Fault Zone Architecture and Growth Based on Enhanced Image of Fault Zone Arrays Using Hybrid Attributes

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Subsurface fault zones play an important role in fluid flow. However, the quantitative research regarding fault damage zones based on conventional seismic attributes is challenging. Therefore enhancing the interpretation of subsurface fault zones using advanced workflows is a priority. We try to highlight these apparent fault zone arrays using 3D seismic data from the M17 prospect. Based on the dip-steering cube computed from the original seismic data, several conditioning approaches were co-used with multiple seismic attribute calculations and a supervised neural network. The computed hybrid attributes based on these methods have enhanced the images of the fault zone arrays. We propose five basic types of fault zone architecture regarding the fault zone arrays based on quantitative analysis via the hybrid attributes and previous research. The fault zone types correspond to different linkage types, representing different evolution stages of fault zone growth. This research has implications for understanding the architecture and growth of related fault zone arrays.